doubt, for mathematical teaching is almost as bad as scientific, although mathematics is compulsory in responsions. But it is clear enough that the proposal can only be defended on the former ground, for it would be preposterous to impose a useless burden on ninety-five per cent. of undergraduates, in order to raise the standard of a particular five per cent. Now, independently of the fact that the "elements of natural science" is a phrase very vague and difficult to define, it may be fairly urged that these "elements" consist of a series of interesting and important facts, of which, however, the connection and interaction is by no means apparent without a fairly comprehensive knowledge. It would be perfectly useless to have a knowledge of natural laws, when the idea of "law" is, in itself, entirely imperfect, as Helmholtz has held it to be in the unmathematical mind. A knowledge of science may be desirable, but equally so is a knowledge of history, or of English law. But if it be expedient to enlarge the scope of responsions in any way, it is abundantly clear that deeper, instead of wider, knowledge should be required: for example, the standard of mathematics might with good reason, perhaps, be raised.

One more remark seems needed in reply to your article. In attributing to the Greeks a true scientific spirit, your correspondent shows a strange and radical misconception of the tendency of Greek philosophic thought. The Hellenic spirit always inclined to speculative and metaphysical, as opposed to experimental philosophy, and Aristotle probably did more to retard our knowledge of natural science than any ten men have ever done to advance it.

The science school at Oxford may, and it is to be hoped will gradually improve, both in size and in quality; especially is there room for hope in the case of the medical school, though it is sadly handicapped by the absence of those opportunities for practical teaching which only a great hospital, situated in a crowded city, can afford. But it is useless to hope that the whole natural science school will ever become very large, so long as the tendency towards devolution and decentralisation in university (which ought to mean the highest) education continues. The principle of centralisation of educational forces, the enormous importance of which seems nowadays to be so lamentably lost sight of, possesses an especial validity in the case of scientific education. If this principle be neglected, it is our own fault if we find, on the one hand, a teaching staff of the highest order without pupils to instruct, and admirably equipped museums and laboratories standing practically idle and in abeyance; and, on the other hand, the best teachers so scattered up and down the country as to hinder the receptive student from gaining the advantages he would otherwise reap from their combined and systematised tuition.

W. E. P.

Liverpool, August 3.

The Mandrake.

IN an anonymous work in Chinese, "Tiau-sieh-lui-pien" (1), nine plants are named as frequently to assume the human or animal figures, viz. cypress, Nan-tree,[1] turnip, mustard, citron, *Pachyma cocos*, *Lycium chinense*, *Phytolacca acinosa*, and *Panax Ginseng*.[2]

Of these nine, doubtless the Ginseng is the plant most celebrated for its medicinal virtues imaginarily connected with its anthropomorphous root (2); but as far as the multiplicity is in question of the legends talked of analogous to the mandrake-stories, certainly the Shang-luh (*Phytolacca acinosa*) is the most notorious one.

Under the heading at the beginning of this letter, I wrote to NATURE (vol. li. p. 608, April 25, 1895) a note on the analogies between the mandrake- and the Shang-luh-lores, pointing out the two instances, viz.:

(1) The roots of the two plants are said to have human shape.

(2) Both plants are said to have the power of shrieking.

Continuing in the research from that point, I have found further the additional points of analogy, that are as follows:—

(3) The Shang-luh is said to grow upon the ground beneath which dead man lies; and the mandrake is recorded to thrive under the gallows (3).

(4) When the Shang-luh is about to acquire the power of speech, *ignes fatui*, it is said, crowd about it (4). About the mandrake Richard Folkard remarks: "In an Anglo-Saxon manuscript of the tenth or eleventh century the mandrake is said to shine in the night like a candle. The Arabs call it the Devil's Candle because of this nocturnal shining appearance. . . ." (5)

(5) Chang Urh-Ki, a Chinese literatus of the seventeenth century, writes: "A sorcerer carves the root of Shang-luh into a human effigy, which he makes through his spells capable of telling the fortunes" (6). This forcibly brings to mind the old European belief in the diminutive prophetic images made out of mandrake-root[1] (7).

(6) The mandrake had a reputation that it makes men insane and the reason prisoner (8); correspondingly the red variety of Shang-luh[2] is described by Su Kung (*c.* 656) to be so poisonous as to cause men to see the demons (*i.e.* to make men delirious) (9).

(7) In "Pan-tsau-king," the oldest Chinese authority on materia medica, attributed to the mythical emperor, Shin-Nung, the Shang-luh is mentioned to kill the demoniacal beings; and, later, Teau Hung-King (452–536) speaks of its influence on the "Malignant Worms," which it drives out of the possessed (10), this efficiency being no doubt the principal reason for the Tauist usage of the white Phytolacca under the pseudonym of "Luh-fu" (or "Dried Venison") (11). Still later it is reputed by Ta-Ming (*c.* 968) to purge the "Poison of the *Ku*"[3] (12). Quite conformable to these is the ancient Jewish belief in the exorcising power the herb Baaras (or the mandrake) was renowned to possess (13).

(8) A recipe quoted by Chang Urh-ki from a "Book of Divine Physic" (14) seems to imply the old Chinese usage of the Shang-luh as philtre as much as the mandrake was highly esteemed therefor (15).

(9) "From the remotest antiquity the mandrake was reputed in the East to possess the property of removing sterility; hence Rachel's desire to obtain the plant that Reuben had found. . . ." (16). Now we read in a Chinese herbal that the black, ripe fruit of the Shang-luh is highly valued by rustic women, for it favours their fertility (17).

(10) Of the medicinal properties these plants are known to possess, some are common to both. Matthioli, referring to Galen, speaks as a cooling stuff of the mandrake (18), Li Shi-Chin assigning the same character to the Shang-luh (19). Both herbs were famed for their purgative functions, and both were applied to indolent and scrofulous tumours, and to swellings of the glands (20).

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[1] Some Japanese botanists (*e.g.* Matsumura, "Nippon Shokubutsu Meii," Tôkyô, 1884. p. 64) identify the Chinese "Nan" with the Euphorbiaceous plant, *Daphniphyllum macropodium*; whether the identity is a sound one, I do not know.

[2] Most plants here enlisted, seem to have the alleged figures in their subterraneous members; only the citron might produce the fruits of such a configuration. As to the named trees, the cypress of Kien-ling was anciently valued for its wood, the veins of which represented naturally angels, clouds, men and animals ("Yuen-kien-lui-han," *op. cit.*, tom. ccccxiii. art. "Peh," 1); whereas the alleged human figure of the "Nan" was apparently formed by its stem and branches (*cf.* H. Ransdell, "Through Siberia," 1882, vol. i. p. 158).

[1] From their traditions, the Chinese appear to have had about the Fung (*Liquidamber Maximowiczii*) two points of analogy to the mandrake-lore. First, Jin Fang's "Shuh-i-ki" (written sixth century, A.D., ed. Wang, tom. ii. fol. 10, *b*) contains the following passage: "In Nan-Chung there is the 'Liquidamber-Elf' (Fung-sze-kwei), which is the old tree of the named species transformed to man in its shape. Second, other authorities say a tumour develops upon the old Liquidamber; after a thunderstorm it elongates to three or five feet in length. Now the sorcerer carves this tumour to a human effigy to play black art thereby in a similar manner to the practice with the Shang-luh. However, in case a proper formula is not observed while gathering it, the tumour flies away and never serves the purpose (*cf.* Ki Ngan, "Nan-fang-tsau-muh-chwang," fourth century, A.D., Brit. Mus. copy, 15255, *a*. 5, tom. ii. fol. 1, *a*; Wu Ki-Siun, *op. cit.*, tom. xxxv. fol. 2 *a*; Sie Tsai-Kang, *op. cit.*, tom. x. fol. 4). Whether related to the latter belief or not, I remember some old men in Japan ever extolling the merits of images of Daikoku, the god of riches, artificially formed out of tumours on *Gingko biloba*.

[2] That is, the variety with its calyx coloured pale rufous. Kan-Pau-Shing, a herbalist of the tenth century, observes of the Shang-luh: "The red flower accompanies the red root and the white flower the white root" (*See* Iinuma, "Sômoku Dzusetsu," new ed., 1874, vol. vii. fol. 89, *b*; Li Shi-Chin, *loc. cit.*)

[3] "The district of Kiang-Nan is much infested by the *Ku*. On the fifth day of the fifth moon, the future keeper of the *Ku* puts together in a vessel a hundred different sorts of animals, varying in size from serpent to louse, which are left therein to mutually devour till but one remains the strongest. This he keeps and feeds in his house as the *Ku*. Whomsoever the keeper wishes to destroy the *Ku* infests in the viscera; consequently the man dies, his treasures passing over to the *Ku*-keeper's house," &c. ("Sui-shu," written seventh century, A.D., quoted in Tsiau Hwang, "Tsiau-shi-pih-shing," Brit. Mus. copy, 15316, *a*, fasc. ii. tom. v. fol. 24, *a*; Ching Tsiau, *op. cit.*, tom. xxxiii. fol. 11, *b*; *cf.* Morrison, "Dictionary of the Chinese Language," London and Macao, 1823, vol. iii. part i. p. 288.) Among the stories pertaining to the *Ku* several incidents occur parallel to those about the mandrake (*cf.* Folkard, *loc. cit.*; Li Shi-Chin, sub. "Kin-tsan"; Kitamura, Kiyû Shôran, new ed., Tôkyô, 1882, tom. viii. fol. 22). Just as are the cases with the mandrake and the Shang-luh, a herb called Lang-tang (*Scopolia* sp. ?) is reputed to make men insane, yet withal to cure demoniacal possession (*cf.* Wu Ki-Siun, *op. cit.*, tom. xxiv. fol. 77, *b*.; Josephus, *loc. cit.*).

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So far the many analogies between the mandrake- and the Phytolacca-stories appear to militate against the probability of the independent growths, if not origins, of the folk-lores connected with the two plants.

Further, it may be worthy of notice that, while the ancient Europeans possessed a hazy knowledge of the anthropomorphous Ginseng (21), the Chinese of middle ages had an equally circuitous acquaintance with the mandrake. The fact is well evinced in the following passage of Chau Mih (1232–1308) (22): "Several thousand miles west of the Region of Moslem,[1] the land produces one substance extremely poisonous, which is shaped like man as our Ginseng is. It is called 'Yah-puh-lü,' and grows under the ground several *chang* deep [1 *chang* = 10 Chinese feet]. Should a man bruise its skin, its poison would adhere to and kill him. The only method of gathering it is this: dig around the said substance a hollow deep enough for a man's management therein; with one end of a thong tie up the substance lightly, and with other end bind round a big dog's leg. Now flog the dog; he will, striving to avoid the danger, pluck the substance from the ground, but he will die instantly. The stuff thus procured is buried under other ground, whence it is taken out a year after; then it is dried and prepared with another medicine. When man takes internally a bit of this mixed with wine, it makes him soon fall down unconscious even of cuts and chops; still there is a certain drug which, if used within three days, can recover the man. It is very likely that the celebrated Hwa To [a surgeon who flourished in the third century, A.D.] barely resorted to this drug when, as is traditionally said, he cut open his patients' bellies to cleanse viscela without harm. Presently we learn our Imperial Hospital possesses two pieces of this drug."

The readers of the above passage scarcely need my annotations that the story is obviously composed of what Josephus and Dioscorides record (23), and also that the name "Yah-puh-lü" is nothing but "Ybruh," the Arabic word for the mandrake[2] (24).

References.—(1) In "Hai-shan-sien-kwan-tsung-shu," tom. xlvi. (published 1847), pt. i., fol. 76, *b*; the Imperial Cyclopædia, "Yuen-kien-lui-han," 1701, *passim.* (2) "Encyclopædia Britannica," 9th ed., vol. x p. 605. (3) *Cf.* Folkard, "Plant Lore, Legends, and Lyrics," 1884, p. 427; also my letter in NATURE, *op. cit.* (4) Sie Tsai-Kang, "Wu-tsah-tsu," *c.* 1610, Jap. ed., tom. x., fol. 41, *b*, quoted in my letter, *ubi supra.* (5) Folkard, *l. c.* (6) "Hau-ngan-hien-hwa," Brit. Mus. copy. 15316, *a*, tom. i., fol. 4, *b*. (7) Same as (5) and (8). (8) "Encyc. Brit.", vol. xv. p. 476. (9) and (10) Li Shi-Chin, "Pan-tsau-kang-muh," art. "Shang-luh." (11) Ching Tsiau, "Tung-chi," Brit. Mus. copy, 15281, *a—d*, tom. lxv., fol. 28, *a*. (12) Same as (9). (13) Josephus, "Jewish War," trans. Traill, 1851, book vii. p. 230. (14) Same as (6). (15) and (16) Folkard, *op. cit.* (17) Wu Ki-Siun, "Shih-woh-ming-shih-tu-kau," completed *c.* 1848, ed. Ono, Tôkyô, 1884, tom. xxiv., fol. 16. (18) "I Discorsi, &c.," Venetia, 1568, p. 1136. (19) Same as (9). (20) *Cf.* W. Rhind, "History of the Vegetable Kingdom," 1874, p. 552; same as (8) and (9). (21) *e.g.* Cruden, "A Complete Concordance to the Old and New Testament," 20th ed., p. 436. (22) "Chi-ya-tung-tsah-chau," Brit. Mus. copy, 15316, *a*, tom. i. fol. 41–42. (23) Josephus, *l. c.*; Mart Mathée, "Les six Livres de Pedacion Dioscoride," Lyon, 1559, l. iv., ch. lxv. p. 274. (24) Pickering, "Chronological History of Plants," Boston, 1879, p. 247.

KUMAGUSU MINAKATA.

15 Blithfield Street, Kensington, W., July 16.

P.S.—In writing the present letter, I have not consulted the late Prof. Veth's exhaustive account of the mandrake-stories referred to in NATURE (vol. li. p. 573.) To my great regret it is written in Dutch, a language which is beyond the reach of my understanding.

K. M.

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[1] In another work by same author, "Kwei-sin-tsah-shih," quoted by Li Shi-Chin, *op. cit.*, sub. "Yah-puh-lü," this herb is said to grow in the "Region of Moslem, north of the Desert," and there it is indicated that the degraded officers of an extreme ignominy used this drug [to feign self-murder]. The Imperial "Yuen-kien-lui-han." *op. cit.*, tom. ccccxi., gives a proverb: "Eat the herb by name Yah-puh-lü; you die, still you are not dead."

[2] Fang I-Chi, the most erudite Chinese of Christian faith, referring to a work of the thirteenth (?) century, "Fang-yu-shing-loh," gives the habitat of the narcotic "Yah-puh-lü-yoh" in the country of Medina ("Tung-ya," 1643, tom. xli., fol. 8, *b*). Conventionally the latter name might be interpreted as the "Drug named Yah-puh-lü," but I am rather inclined to trace it to the name "Yabrochak" used in Palestine for the mandrake (Pickering, *loc. cit.*)

THE ECLIPSE OF THE SUN.

IF it be true that science advances through failures, the clouds which prevented the observation of the total eclipse of the sun last Sunday may be a blessing in disguise. During the past quarter of a century, several astronomers have taken up the problem of discovering a means of photographing the corona in broad daylight, but the results have not been very encouraging. In the photography of solar prominences, Prof. Hale and Dr. Deslandres have obtained distinctly valuable pictures, and, were it possible to delineate the corona with the same success on any day when the sun is shining, our knowledge of the nature of that solar appendage would increase much more rapidly than it can at present, when the only opportunities for studying it are afforded by the brief moments of totality of a solar eclipse. Perhaps last Sunday's experience will induce solar physicists to give further attention to the artificial reproduction of eclipse conditions. It is, of course, not suggested that every-day observations will make eclipse expeditions unnecessary—there will be work for astronomers during solar eclipses for a long time to come—but if it were possible to carry out systematic researches on the structure and constitution of the solar surroundings, instead of depending entirely upon the rare intervals when the photosphere is obscured, several moot points might be settled before the end of this century.

Observations of the total eclipse of Sunday last were made impossible by clouds. From all along the line of observers, the same report of foiled intentions has been received. At Vadsö, and in the neighbourhood, the sun was entirely obscured during totality, and no observations of scientific importance were obtained. The party of Russian astronomers who stationed themselves at the village of Orloffskoe, on the Amur, were equally unsuccessful in making observations. The eclipse was visible as a partial eclipse at Tokio, but at Akeshi, in the island of Yezo, where the Japanese, American, and British observers had set up their instruments, the weather was wet and the sky cloudy, and it is reported that the preparations made ended in a fiasco. It is not definitely known what happened at Esashi, where Prof. Todd and Dr. Deslandres were stationed, but little hope of success is entertained. A telegram received at Copenhagen from Bodö, Norway, states that a photographer from Flensburg has taken eleven photographs of the eclipse at Bredvik, on the Skjerstad Fiord, but more details are needed before an opinion can be expressed as to their value. News has yet to be received from the British observing party at Nova Zembla, and from the expeditions of the Russian Astronomical Society stationed at Enontekis (Finland), the mouth of the Obi, and Olekminsk, on the Lena.

Mr. Norman Lockyer has sent us the following telegram from Kiö Island, where he established a station to observe the eclipse: "Although the sun was clouded during totality, the sight was most impressive. The darkness was so great that lamps were needed. The party from H.M.S. *Volage* consisted of seventy-seven observers all trained to make notes or drawings of particular characteristics of eclipse phenomena, such as coronal structure, extent of the corona, and the colours of sky, cloud, and land and water surfaces, and to take the times of contact. The party was also provided with spectroscopes for analysing the lights of the corona and prominences, prismatic cameras for photographing the spectra of these objects, and polariscopes." With such an army of organised observers, an immense amount of valuable information would have been accumulated had the eclipse been visible. The exceptional opportunities for accurate observation offered by the presence of the Training Squadron gives astronomers reason for keen disappointment at the failure of the eclipse as an observable event; but students of science are used to the

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